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TWO NEW SPECIES OF THE ANT GENUS *Prenolepis* FROM YUNNAN CHINA (Hymenoptera: Formicidae)

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Abstract Two new species of the ant genus *Prenolepis* Mayr are described in Yunnan, China, i. e. *P. nigriflagella* sp. n. and *P. magnocula* sp. n. A key based on worker caste is given to the known species of Southern and Eastern Asia.

Key words Hymenoptera, Formicidae, *Prenolepis*, Taxonomy, Yunnan, China, S. & E. Asia

The ant genus *Prenolepis* was erected by Mayr in 1861. In this small genus, about 10 species are described in the Palaearctic, Oriental, Nearctic, and Neotropical regions (Morisita *et al.*, 1991). In early time, many species were placed in this genus (e. g. Mayr, 1870; Bingham, 1903). Later, most of them were transferred to *Paratrechina* Motschulsky (Wheeler, 1930-1931). Some species of the genus were revised by Brown (1955), Smith (1957), Wilson *et al.* (1967), Snelling (1976), and Trager (1984). To date, one species is known in Europe (Agosti *et al.*, 1987). Collingwood (1981) reported one species in Korea. Bingham (1903) recorded 10 species in India, Ceylon and Burma, however, these species may be transferred to *Paratrechina* except *P. melanogaster* Emery and *P. naoroji* Forel (Forel, 1894, 1912, 1913) described 2 species and 1 variety in Hongkong and Taiwan, i. e. *P. emmae* Forel, *P. formosae* Forel, and *P. minutula* var. *sauteri* Forel. Tang *et al.* (1985, 1987) reported 2 species in Zhejiang and Yunnan Provinces, i. e. *P. longicornis* (Latreille) and *P. yerburyi* Forel. According to the modern concept of *Prenolepis*, the above mentioned 5 species and variety known in China have been moved out of the genus. Recently, Tong *et al.* (1988) reported 1 species *P. melanogaster* Emery in Hunan Province. When we study the ant fauna of Southwestern China, 2 new species of *Prenolepis* are collected in Yunnan Province. The type specimens are

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deposited in the Insect Collection, Department of Forest Protection, Southwest Forestry College, Kunming, Yunnan, China.

Measurements and indices are as defined by Hölldobler *et al.* (1990): Total length(TL), Head length(HL), Head width(HW), Cephalic index(CI), Scape length(SL), Scape index(SI), Pronotal width(PW), Alitrunk length(AL), Maximum diameter of eye(ED). All measurements are expressed in millimeters.

Prenolepis Mayr

Prenolepis Mayr, 1861 Europ. Formicid.: 52. Bingham, 1903 Fauna Brit. India Hym. 2: 325. Hölldobler & Wilson, 1990 The Ants: 18.

Key to species of Southern and Eastern Asia based on worker caste

1. Head and alitrunk orange yellow to orange brown, gaster black. Head broader than long or as broad as long. Eyes moderately large, not prominent. Anterior margin of clypeus incised in the middle. TL 4.9–5.8 2

   Head and alitrunk yellowish brown to blackish brown. Head longer than broad. Eyes large and prominent. Anterior margin of clypeus complete, not incised in the middle. TL 2.5–3.5 3

2. Head broader than long. Anterior margin of clypeus almost straight. Head and alitrunk feebly punctured, subopaque. Antennal segments concolor with head, orange brown(China: Hunan; Burma, Korea) ..... *melanogaster* Emery

   Head as broad as long. Anterior margin of clypeus roundly prominent. Head and alitrunk smooth and shining. Antennal segments 3–12 black or blackish brown (China: Yunnan) ..... *nigriflagella* sp. n.

3. Head and alitrunk yellowish brown, gaster brown. Clypeus convex, medially longitudinally carinate (India: Assam) ..... *naoroji* Forel

   Head blackish brown, alitrunk yellowish brown to brownish yellow, gaster black. Clypeus convex in the centre, but without a longitudinal carina (China: Yunnan) ..... *magnocula* sp. n.

Prenolepis nigriflagella sp. n. (Figs. 1–3)

Holotype worker, TL5.3, HL1.25, HW1.25, CI100, SL1.70, SI136, PW0.78, AL1.85, ED0.25.

Head subtriangular, as broad as long, much broader posteriorly than in front. Occipital margin straight, occipital corners rounded, cheeks convex. Eyes moderately large, situated above the midlength of the head. Mandibles armed with 6 teeth on the masticatory margin, the apical and the fourth ones larger. Clypeus large and transverse, convex in the centre, anterior margin roundly prominent, incised in the middle. Antenna long, filiform, with 12 segments, scape extending beyond the occipital margin of the head by more than half its length, flagellum slightly incrassate towards apex. Alitrunk strongly constricted in the middle of mesothorax, pronotum and propodeum strongly roundly convex, declivity nearly flat. Promesonotal suture and

metanotal groove conspicuous. Legs long, basitarsus of hind leg very long, about 1.5 times the length of the rest 4 tarsal joints together. Petiolar node low and transverse, inclined forwards, subtriangular in profile view, narrowing upwards, the dorsal margin straight. In profile view, the first gastral segment angularly and anteriorly convex, overhanging the pedicel, its anterior face broadly concave, in dorsal view anterior margin of gaster nearly straight. Mandibles smooth, head, alitrunk, and gaster smooth and shining. Dorsum of head and body covered with numerous erect or suberect long hairs and sparse subdecumbent pubescences. Dorsa of antennal scapes and hind tibiae with abundant suberect hairs, hairs much longer than the width of scape and tibia. Head and body in colour orange yellow, gaster black, antennal segments 3–12 blackish brown.

Paratype workers, TL 4.9–5.8, HL 1.23–1.33, HW 1.20–1.33, CI 98–102, SL 1.65–1.80, SI 129–142, PW 0.75–0.85, AL 1.75–2.00, ED 0.25–0.28(8 measured). As holotype, but in some individuals antennal segments 3–12 black, or mandible with 7 teeth.

Holotype: worker, Lincang Co. (23.8 ° N, 100.0 ° E), 1550 m, Yunnan Prov., 13–X–1991, No. A91–1103(Xu Zhenghui). Paratypes: 5 workers, with the same data as holotype; 10 workers, with the same data as holotype but No. A91–1093.

The new species is close to *P. melanogaster* Emery, but the new one with the antennal segments 3–12 black or blackish brown, in full face view the head as broad as long, anterior margin of clypeus roundly prominent, head and alitrunk smooth and shi ning.

Prenoloepis magnocula sp. n. (Figs. 4–6)

Holotype worker, TL 3.3, HL 0.75, HW 0.60, CI 80, SL 1.08, SI 179, PW 0.45, AL 1.03, ED 0.23.

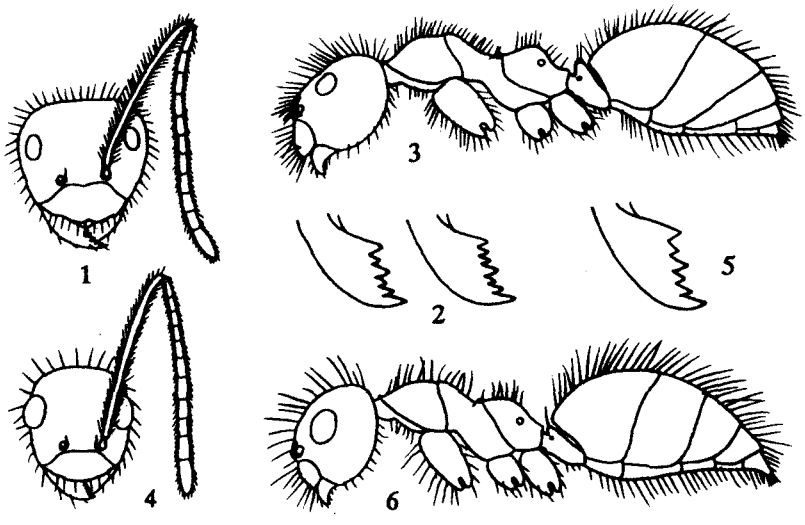
Head longer than broad, distinctly broader posteriorly than in front. Occipital margin slightly convex, occipital corners rounded. Eyes large and prominent, placed behind the midlength of the head. Mandibles long triangular, armed with 6 teeth on the masticatory margin, the apical, the fourth and the basal ones larger. Clypeus broader than long, strongly convex in the centre, anterior margin roundly prominant and complete. Antenna filiform, with 12 segments, scape extending beyond the occipital margin of the head by more than half its length, flagellum slightly incrassate towards apex. Alitrunk distinctly constricted in the middle of mesothorax, pronotum and declivity slightly convex, propodeum roundly convex. Promesonotal suture and metanotal groove conspicuous. Legs long, basitarsus of hind leg very long, about 1.3 times the length of the rest 4 tarsal joints together. Petiolar node low and transverse, in profile view subtriangular, inclined forwards, narrowing upwards, dorsal margin straight. In profile view the first gastral segment strongly anteriorly convex, overhanging the pedicel, its anterior face broadly concave, in dorsal view anterior margin of gaster

straight. Mandibles smooth, head and alitrunk smooth and shining. Gaster with very weak and fine reticulations, less shining. Dorsum of head and body covered with abundant erect or suberect long hairs, hairs on the gaster denser. Head with sparse decumbent pubescencs, pubescence on alitrunk and gaster quite rare. Dorsa of antennal scapes and hind tibiae with abundant subdecumbent hairs, hairs longer than the width of scape, and as long as the width of tibia. Head blackish brown, mandibles, antennae, alitrunk, legs, and pedicel yellowish brown, gaster black.

Paratype workers, TL 2.5–3.3, HL 0.63–0.75, HW 0.55–0.65, CI 80–90, SL 0.95–1.15, SI 175–183, PW 0.39–0.49, AL 0.88–1.10, ED 0.19–0.23(8 measured). As holotype, but in some individuals mandibles, antennae, alitrunk, legs, and pedicel brownish yellow.

Holotype: worker, Wenshan Co. (23.3 ° N, 104.2 ° E), 1320 m, Yunnan Prov., 30-Ⅷ-1991, No. A91-445(Xu Zhenghui). Paratypes: 10 workers, with the same data as holotype; 10 workers, with the same data as holotype but No. A91-435.

The new species is close to *P. naoroji* Forel, but the new one with blackish brown head and black gaster, clypeus convex in the centre, but without a longitudinal carina.



Figures 1–6 *Prenolepis* workers

1–3 *P. nigriflagella* sp. n. 4–6 *P. magnocula* sp. n. 1, 4, Head in full face view 2, 5, Mandible in dorsal view 3, 6, Body in profile view

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云南平结蚁属二新种（膜翅目：蚁科）

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摘要 本文记述云南省平结蚁属 *Prenolepis* Mayr 2新种：黑角平结蚁 *P. nigriflagella* sp. n. 与黑腹平结蚁 *P. melanogaster* Emery 接近，但新种触角3—12节黑色或黑褐色，正面观头部长宽相等，唇基前缘圆形突出，头胸部光滑发亮。大眼平结蚁 *P. magnocula* sp. n. 与那氏平结蚁 *P. naoroji* Forel 接近，但新种头部黑褐色，腹部黑色，唇基中央突起，无纵脊。文中提供东亚和南亚地区已知种检索表。模式标本保存于云南昆明，西南林学院森林保护系昆虫标本室。

关键词 膜翅目，蚁科，平结蚁属，分类，中国云南，东亚和南亚

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$$F = 43477.54 - 254.87892L + 0.4096702L^2 \quad (r = 0.9531 \quad P < 0.01)$$

即随体长的增加，繁殖力增大，其增大速度增加（图 1），同时，繁殖力与体长的关系也可用幂指数关系式表达：

$$F = 6.5478106 \times 10^{-8} \times L^{4.234306} \quad (r = 0.8276 \quad P < 0.01)$$

鱼类的繁殖力一般是随体长和体重的变化而变化的，许多研究者均利用数学模型对此进行回归相关关系的研究，对某种鱼而言，其理论模型的有关参数是相对稳定的，繁殖力与体长的关系在许多鱼类中是呈幂指数相关关系，即 $F = aL^b$，，常见值略大于 3.0。在裂腹鱼类，*Schizothorax richardsonii*（$N=20$）的 b 值是 3.4001，*Schizothorax curvifrons*（$N=60$）为 3.2505，四川裂腹鱼 b 值为 4.2343（$N=30$），大于上述两种印度鱼类，也大于珠江卷口鱼（$b=2.6208$），但仍小于 5.28 这一记录的最高值。就幂指数模型的生物学意义而言，繁殖力的大小取决于鱼类的体积变化，因此，b 值常见为 3.0，但各种鱼类的生长特性各有不同，故 b 值的变化又反映了这种生长特性，b 值越大，说明与体长关系越密切，越小则与体长关系越小，四川裂腹鱼寿命较长，达到繁殖年龄后仍不断生长，故其 b 值相对就较大。

2.3 繁殖力与体重、净体重、卵巢重的关系 繁殖力与体重、净体重、卵巢重呈直线型相关，其数学表达式分别是：

$F = 9.170884\ W - 1091.367$ $(r - 0.9509 \quad P < 0.01)$

$F = 12.03143\ NW - 2086.293$ $(r = 0.9437 \quad P < 0.01)$

$F = 59.32451\ OW + 2644.6117$ $(r = 0.9671 \quad P < 0.01)$

表明繁殖力随体重、净体重、卵巢重的增大而增大，但其增大的速率（即直线的斜率）是不一致的（图 2、3）。

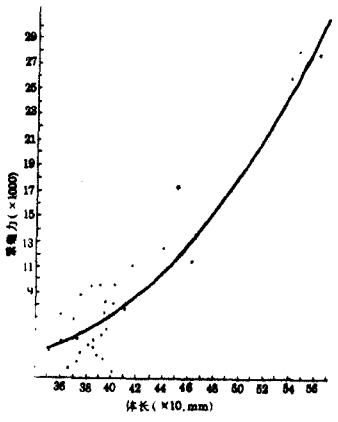

图 1 繁殖力与体长的关系

Fig. 1 Fish length and fecundity relationship in *Schizothorax kozlovi*

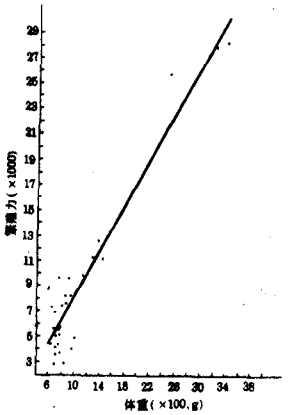

图 2 繁殖力与体重的关系

Fig. 2 Fish weight and fecundity relatonship in *Schizothorax kozlovi*

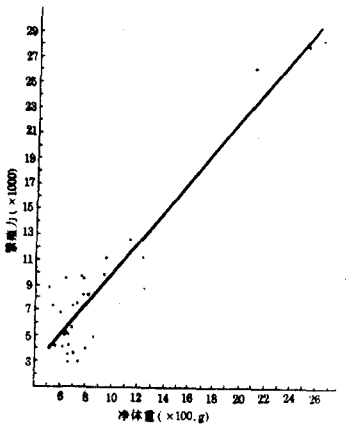

图 3 繁殖力与净体重的关系

Fig. 3 Fish net weight and fecundity relationship in *Schizothorax kozlovi*

2.4 繁殖力与肥满度的关系 繁殖力与肥满度呈抛物线型相关，其数学表达式是：

$$F = 40892.55 - 627955.3K + 2751685K^2 \quad (r = 0.7307 \quad P < 0.01)$$

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